

# Multicasting Technique to establish path from source to Destination in Mobile adhoc networks

Nishi Sharma | Vikas Kumar Garg | Rakesh Kumar

Assistant Professor, Department of CSE, BGIET Sangru, Punjab, India.

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## ABSTRACT

A network which does not have any centralized authority and has numerous nodes deployed within it is known as mobile ad hoc network. The nodes can enter or leave the network at any time. This decentralized nature of this type of network results in causing numerous security issues. Multicasting in MANETs has been a major concern recently which has been discussed in this paper. Using multicasting nodes, enhancements have been done in DSR protocol in this paper. In terms of performance parameters throughput, delay and packetloss, the performance of the network is determined here.

*Keywords:* MANET, Routing, Multicasting, Throughput, DSR, AMODV

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## I. INTRODUCTION

Two or more computers connected together for accomplishing various tasks is known as a network. The users can exchange their information and communicate with each other very easily. The linking of two or more computers is defined as a network. A robust infrastructure less wireless network which involves the communication between both fixed as well as mobile nodes is known as Mobile Ad Hoc network. There are various arbitrary topologies created due to the random connection of the nodes. They act either as routers or as hosts and can also configure themselves which can thus increase the usage of this technique within various applications. Mainly the applications which cannot have any communication infrastructure and might include emergency situations and rescue operations such as disaster-prone areas need such type of network infrastructures within them [1]. There are both

static as well dynamic topologies involved within the MANET routing protocols. There are no centralized or fixed infrastructures present within the ad hoc networks. This leads to various challenges arising within the functionality of these networks and to avoid this, the MANETs are introduced within the wireless ad hoc networks. The traffic received from the intermediate nodes is accepted and routed towards the destination within this network. This means that it can be represented as a router as well as a host. The energy constraints present on the mobile nodes are the most prominent ways which can deplete the connections amongst the nodes. There is limited bandwidth and node mobility in case of MANETs. Due to this reason the energy efficiency of the nodes, change in topology as well as the unreliable communication within the design are very important factors. There are various protocols present within this network type [2]. By determining the battery consumption of the

participating node as well as the routing traffic within the traffic are helpful in determining the efficiency of a specific routing protocol. The various types of routing protocols are: AODV (Adhoc on Demand Distance vector), DSR (Dynamic Source Routing), OLSR (Optimized Link State Router), Wireless Routing Protocol (WRP) and Zone Routing Protocol (ZRP) [3]. The communication amongst the nodes with the help of routers is done through the routing protocols present within the network. The exchange of information amongst the intermediate nodes is done within the complete network. The shortest route from source end to the destination end is to be identified for providing an efficient communication within the network which can be done through these routing protocols. A list that comprises of the fresh routes as well as their distance from the source node is held within the proactive routing protocols. For individual node within the network, there is more than one table present within this protocol and all of these tables are to be made sure that they are updated on regular basis. When there is a frequent change in the topology of the network, the information is update accordingly by propagating to each node present within the network and updating the tables which contain information related to it. A lazy approach which does not contain the complete information of all the nodes present within the network and is on-demand based is known as the reactive protocol. On the basis of the demands of the particular nodes, the routing tables are maintained [4]. The route discovery process is utilized for discovering the path. The bandwidth efficiency is maintained within these types of routing protocols. As per the requirements the routes are built within the network by sending the route requests across the network. High latency is offered during the search of routes which is a negative point to be considered. When there is increase in the requirement of routes, flooding occurs within the network which results in traffic problems. The various types of protocols that follow in this category are AODV, DSR and DSDV. Multicasting is the process in which numerous copies of the packets are transmitted to the various nodes. In this type of routing, both, wired as well as wireless communication is possible [5]. During the deployment of multicasting routing protocols various key points are to be taken care of. Various key features such as the limitations caused by network stability, consumption of batter, bandwidth limitations as well as compromised security are to be taken care of. On the basis of

shared tree on-demand routing protocols a new protocol has emerged known as MAODV which is basically an enhancement of AODV routing protocol. It connects the multi-casting group of members within the network. It can however work on all types of modes which are unicast, multicast as well as broadcast. The information can be gathered from the routing process within the multicasts through this MAODV protocol. A Route Request (RREQ) message is generated by the node if it wants to join a multicasting group or transmit data to it for the first time. For the purpose of joining the RREQ, only the members of that particular group can respond to it [6]. The RREQ is rebroadcasted to its neighbors by the group if the node which has sent the request is not a member of that particular group already. It also replies if there is no already generated route to that node so that the route gets generated and the exchange of information can be possible.

#### Literature Review

Dhanalakshmi Natarajan and Alli P Rajendran explained [7] in this paper a study on the optimized link state routing (OLSR) protocol which is basically a proactive type of routing protocol. The routing packets present within the network are partially or completely uncovered with the help of this source routing protocol. For the purpose of building the link-disjoint or node-disjoint paths there are two cost functions introduced within this paper. For the purpose of dealing with the topology changes of the network, the path recovery process as well as the loop disclosure process is involved within the secondary functions. As per the simulation results it is seen that the protocol is beneficial for the applications that involve the parametric values.

Limin Tang et.al explained [8] that in order to deliver the data to multiple destinations across the internet, there are numerous efficient solutions provided. However, not all the issues are resolved with the help of these methods. An algorithm is proposed in this paper for multicast tree computation in those networks which are not capable for multicasting the nodes that are incapable. In order to provide traverse path computation, two procedures are provided in this paper and the advantages of these two are examined with respect to various parameters.

Li Xut et.al introduced that [9] the mobile ad hoc networks play an important role within the applications that involve any emergency communications within the network at higher

speed. The effect of the load of network on the MAODV protocol is presented in this paper and an optimized MAODV-BB protocol is proposed in this paper. The merits of tree structure and mesh structure are combined together for enhancing the robustness of the MAODV protocol. A multicasting tree is constructed here along with the reinforcement of branches. Also the shorter three branches can be refreshed. The performance of the network is enhanced with the usage of MAODV-BB protocol as shown by the simulation results achieved.

ArushGadkar et.al examined [10] due to the growth in number of high-data transmission applications, the consumption of energy also has become a major concern. There are two different approaches proposed in this paper related to multicasting that are different from each other on the basis of the dropping scenarios of the nodes. The reduction of total number of wavelengths is also required here which will further provide service to multicasting. This will further help in minimizing the overall energy consumption of the network. It is seen through the various simulation results achieved that the proposed approaches have provided a minimization of 25 to 45% wavelength. Various comparisons are also made with the existing techniques and the enhancements in the results are shown through the acquired results.

Ting Lu and Jie Zhu et.al [11] proposed in this paper the major issue which is the consumption of energy of nodes in the wireless ad hoc networks. The exhaustion of batteries within the network is done due to the consumption of energy which is to be managed. For this, the multicasting method which generates control over the power consumption is presented in this paper. In order to resolve the QoS multicast routing issue an energy-efficient genetic algorithm method is proposed in this paper. This is a genetic algorithm that relies on the fixed end-to-end delay and lesser cost of energy for the multicasting tree. It is seen through the simulation results achieved that the proposed method is efficient and effective as compared to existing algorithms.

Tarandeep Singh et.al [12] explained that multicasting is the process of transmitting numerous copies of packets to various nodes within the network. The reduction of the transferring speed, the reduction in lifetime of nodes due to energy consumption and the dynamic topology of the network which is mainly due to the nodes mobility are the major problems of the ad hoc networks. For the purpose of providing

multicasting conditions within the network, a simple, scalable, robust and energy efficient routing protocol is proposed within this paper. The various multicasting routing protocols are proposed in this paper along with their deployment problems within the mobile ad hoc networks.

### **Proposed Work**

This research work is based on to implement multicasting on the place of broadcasting for the path establishment from source to destination. In the technique of broadcasting the source node flood the route request packets in the network and nodes which are adjacent to destination will respond back with the route reply packets. The source node selects the best path from source to destination on the basis of hop count and sequence number. In the network, the technique of broadcasting leads to increase network overhead. In this research the tree based multicasting technique will be proposed which reduce network overhead because the nodes which are able to establish path to destination will receive the route request packets. In the proposed technique following are steps which are followed:-

1. In the first step, the network is deployed with the finite number of mobile nodes. The whole network is divided into two parts the first part is the number of nodes which are in multicasting list on the basis of node distance.
2. In the second step, the destination node starts sending the route request to the nodes which are in the multicasting group to establish path to source node. The nodes will forward the route request messages to its nearest nodes and this process will be repeated until message reached to source node.
3. The path which has minimum hop count will be selected as the best path from source to destination for the data transmission.
4. In the last step, the tree which is constructed for the path establishment from source to destination will also be maintained in which if any node change its location, then node which detect the path failure will send path recovery message to its nearest nodes and node which has minimum distance from destination will be selected as the recovery node.

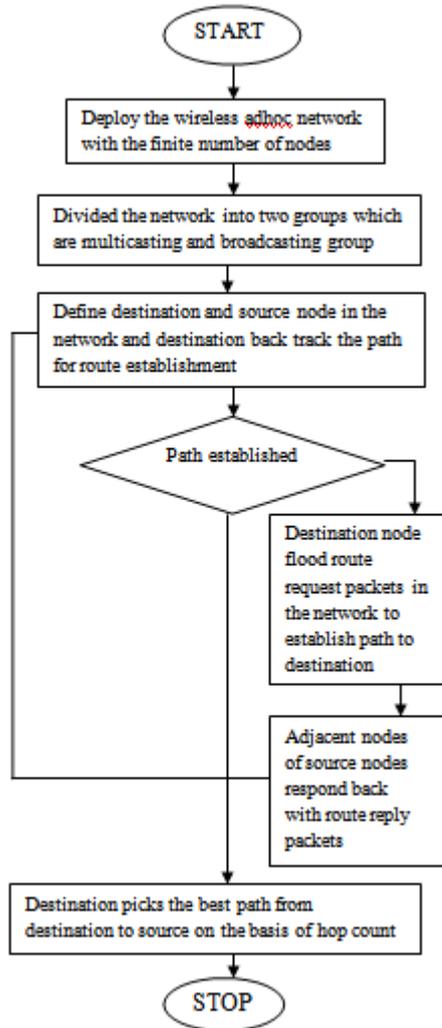


Fig 1: Proposed Flowchart

**Experimental Results**

The proposed work has been implemented in NS2 and the proposed results have been analyzed in terms of throughput, delay and packetloss.

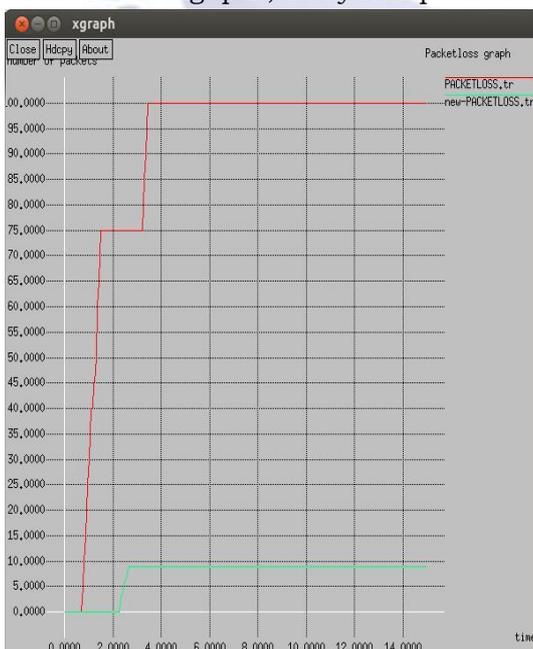


Fig 2: Packetloss graph

As shown in figure 2, there is high packetloss occurring in the network due to the broadcast nature of AODV protocol. In order to minimize the packetloss the multicasting tree is maintained with the help of proposed technique.

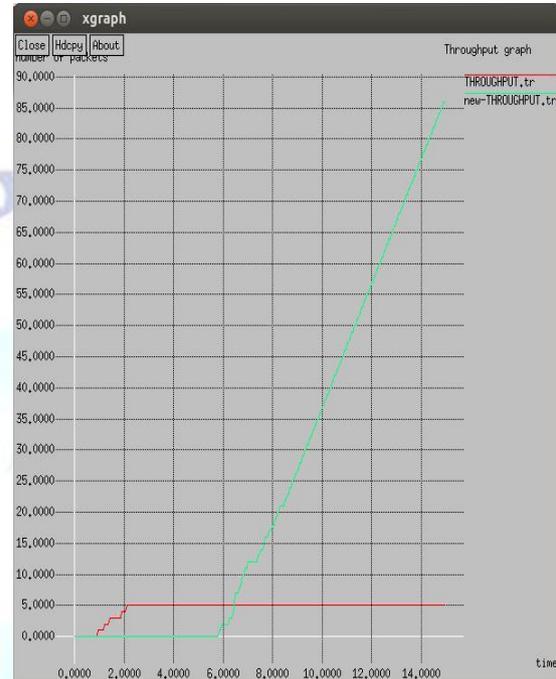


Fig 3: Throughput graph

As shown in figure 3, in comparison to the existing broadcasting nature protocol, the throughput of the network is very high. The throughput is minimized with the help of high bandwidth consumption of the existing technique. The throughput of the network can be enhanced with the help of minimizing bandwidth consumption through multicasting technique.

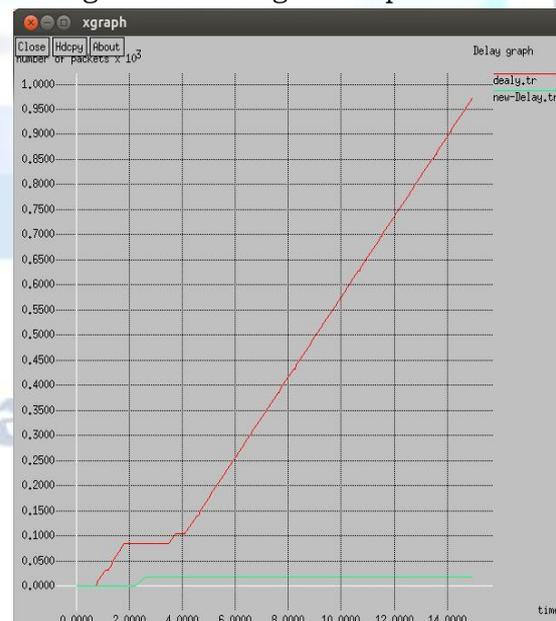


Fig 4: Delay graph

As shown in figure 4, in comparison to the existing technique, the delay is minimized in proposed

technique. This is done through the application of proposed method which includes the reduction of bandwidth consumption.

### Conclusion

Routing is a major challenge faced within the mobile ad hoc networks. The performance of network is degraded due to inefficient routing within the network. An audio-video multicasting technique has been surfed in this paper. Due to its broadcasting nature, DSR protocol consumes higher bandwidth which results in degrading the overall performance of the network. In terms of various parameters, the performance of the network is analyzed.

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